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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/551,316

06/09/2006

Patrick Barry Hook

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EXAMINER

NELSON, MICHAEL B

ART UNIT

PAPER NUMBER

1798

MAIL DATE

DELIVERY MODE

12/30/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/551,316	Applicant(s) HOOK ET AL.	
	Examiner MICHAEL B. NELSON	Art Unit 1798	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 December 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/21/09 has been entered. Claims 1-8 are currently under examination on the merits.

Examiner's Note

2. Claim 3 recites "in with" which seems to be a typo for "in which."

Claim Rejections - 35 USC § 112

3. Claims 2, 3, 7 and 8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claims 2 and 3 recite "from 0.01" and "from 0.001" which is vague and indefinite in that it is unclear if the size is from that number to another number or from that number or higher (or lower).

5. Claims 7 and 8 recites "the variation" and "the axis" which is vague and indefinite in that there is no antecedent basis for this term in claim 3.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 1, 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Caroselli (U.S. 3,625,809) in view of Marzocchi (U.S. 3,631,667).

10. Regarding claim 1, Caroselli discloses a composite with a first high modulus component (i.e. relatively high tensile strength glass, 22, Fig. 1, 2, 3) and a second low modulus component (i.e. elastic component, 20, Fig. 1, 2, 3). When an appropriate amount of force is applied to the composite strand the two components form a helical arrangement with both components wrapping around each other as instantly claimed. The variation in the load on the composite determines the radial position and the helix diameter of both components with the high modulus

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component's helix decreasing as more stress is applied and the low modulus component's helix increasing as more stress is applied. Caroselli does not explicitly disclose that the diameter of the high tensile component is smaller than the other component but it does disclose that a very small diameter glass can be used for the high tensile component (C2, L1-65). Marzocchi which is drawn to a similar invention shows that the high strength glass component can be wrapped around a much larger diameter low strength component (See Fig. 4, Fig. 11, C6, L40-60). While the exact size difference is not disclosed, one having ordinary skill in the art would have found it obvious to alter the diameter of the core elastic component relative to the wrapping high strength component to control the amount of stress taken up by the core component before the high strength component begins to straighten. As in Fig 1-3 (C3, L15-25) of Caroselli, the high strength component does not straighten and bear the load until the elastic component has stretched sufficiently. Therefore by utilizing a thicker core elastic component the amount of stress needed to stretch the core component will increase and the amount of stress the composite structure can absorb will increase correspondingly (allowing for more stress absorption before the high tensile wrapping component is put under strain and has to straighten to bear the load). Hence it would have been obvious to have made the core elastic component thicker to allow more strain to be taken up by the elastic component before the outer wrapping component is required to take the additional strain. With a thicker elastic component, upon stretching, the high strength inelastic wrapper will straighten and force the elastic component into a greater helical diameter and thereby give the composite a greater overall diameter (i.e. to read on the negative effective Poisson's ratio as instantly claimed).

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11. With respect to claim 4, the glass fiber is wrapped around the core fiber roving (Fig. 4, Marzocchi). With respect to claim 5, the first component and the second component are in the shape of continuous fibers wrapped around each other (Fig. 4, Marzocchi, Fig. 1-3, Caroselli) and the glass component is a higher modulus than the elastic component. With respect to claim 6, the elastic component is also a core component when the fiber is in its unstretched condition (i.e. the elastic component straight and the inelastic component wrapping around as in Fig. 1 of Caroselli and Fig. 4 of Marzocchi).

12. Claims 2 and 3, 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Caroselli (U.S. 3,625,809) in view of Marzocchi (U.S. 3,631,667) as applied to claim 1 above, and further in view of Maag et al. (U.S. 4,028,874)

13. Regarding claims 2 and 3, modified Caroselli discloses all of the limitations as set forth above. The thickness of the core elastic component of modified Caroselli would also obvious be increase as explained above in order to increase the elastic load bearing of the composite before the inelastic component takes over. Modified Caroselli does not disclose the exact relative diameters and cross sectional surface areas of the components; however, Maag et al., which is also directed towards a roving wrapped with a fiber (Fig. 1) discloses that the core roving can be made many time larger than the wrapping fiber (C5-20, the core having a total size of 30,000 dtex and the wrapping fiber having a size of less than 15 dtex). The ranges of relative sizes disclosed in Maag include the claimed relative diameters and cross sectional areas.

14. Given that it would have been obvious to have altered the relative thicknesses of the core and wrapping components as explained in the rejection of claim 1, it would have been further obvious to have used the entire range of relative sizes disclosed in the related art of Maag in the

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process of optimizing the amount of load taken up by the elastic core before the inelastic wrapping is forced to straighten out. Using the large difference in size between the two components would allow a substantial amount of force to be taken up by the elastic component before the inelastic component is straightened out.

15. With respect to claims 7 and 8, the increase in load on the composite causes parts of the elastic component to move radially inward during the first stage (i.e. Fig. 2 of Caroselli, when the two components are both helically arranged) and then when the load is further increased parts of the second component moves outwards as the high modulus component fully straightens (i.e. Fig. 3 of Caroselli).

Response to Arguments

16. Applicant's arguments are considered moot in light of the new grounds of rejection provided above which were necessitated by applicant's amendments. Arguments which are still deemed valid are addressed below.

17. Applicant asserts that because one yarn has a higher denier it must be thicker. The examiner notes that this is not necessarily so. If a yarn is made of a material with a different density that would make the comparison of deniers not necessarily correct.

18. Applicant also asserts that the negative Poisson ratio is achieved by virtue of the less elastic filament being much smaller than the elastic one (Page 5). The examiner has taken this under advisement and will rely on this assertion in considering future prior art references (i.e. that if they have a high modulus component helically arranged around a high diameter lower modulus component, the composite will exhibit a negative Poisson's ratio).

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL B. NELSON whose telephone number is (571) 270-3877. The examiner can normally be reached on Monday through Friday 6AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Angela Ortiz can be reached on (571) 272-1206. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Angela Ortiz/
Supervisory Patent Examiner, Art Unit
1798

/MN/
11/16/10